Jan. 17, 1950 G. HAEBERLIN 2,494,807

DECATING MACHINE

Filed Jan. 15, 1946 3 Sheets-Sheet 1

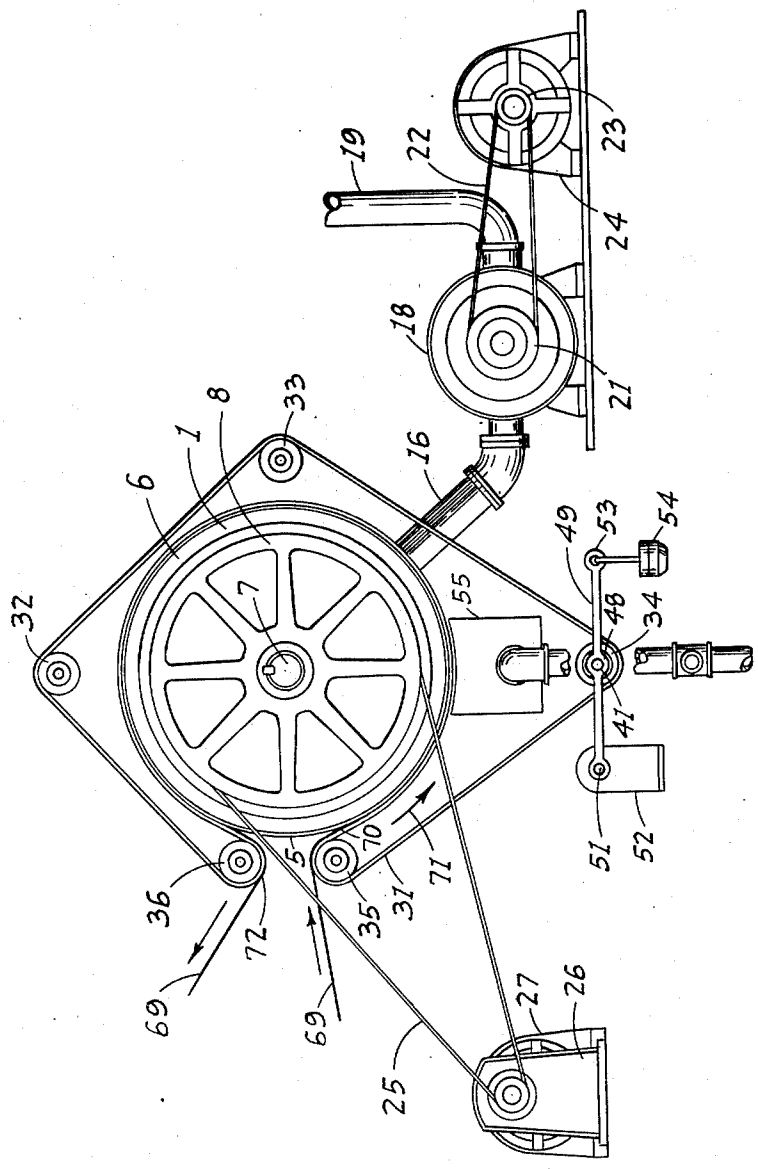


Fig. 1

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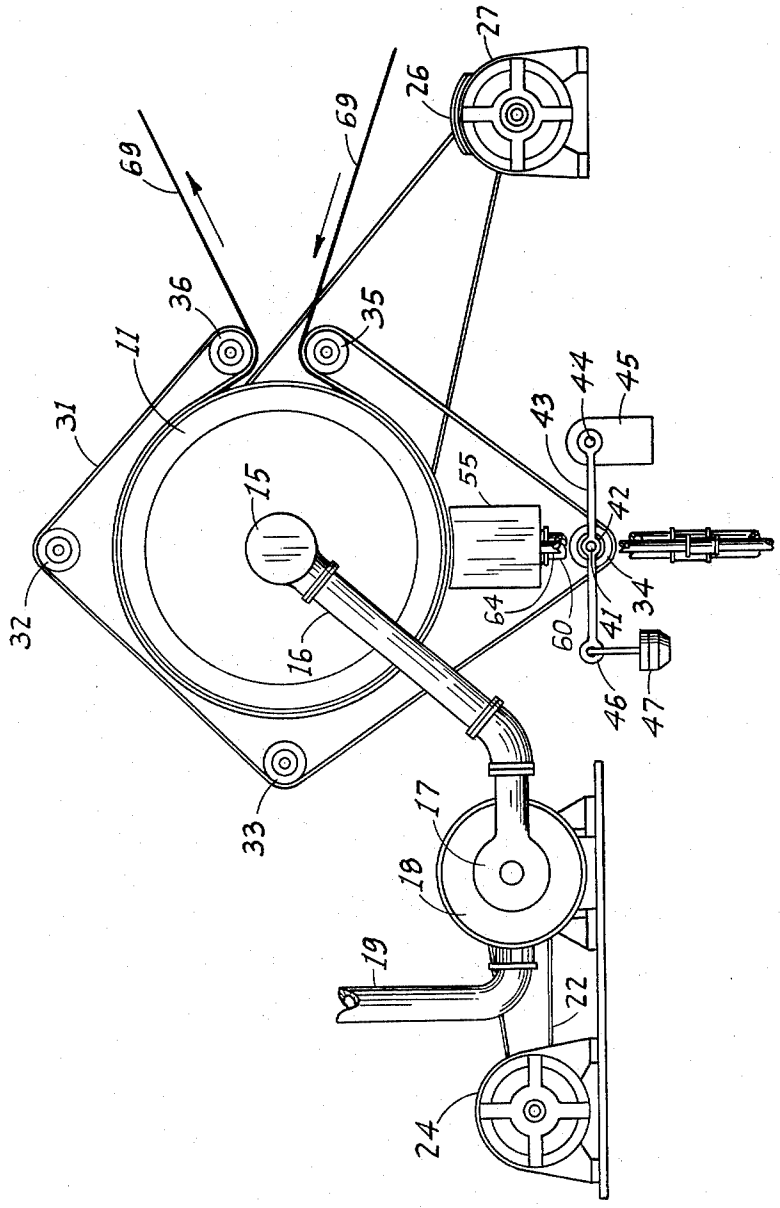


Fig. 2

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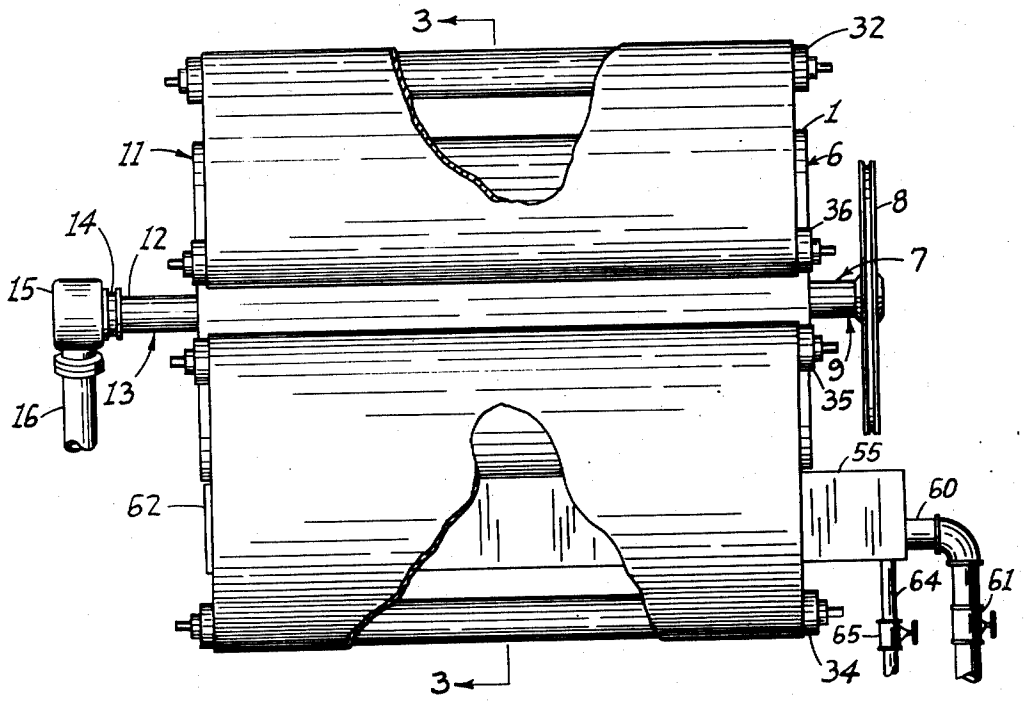


Fig. 3

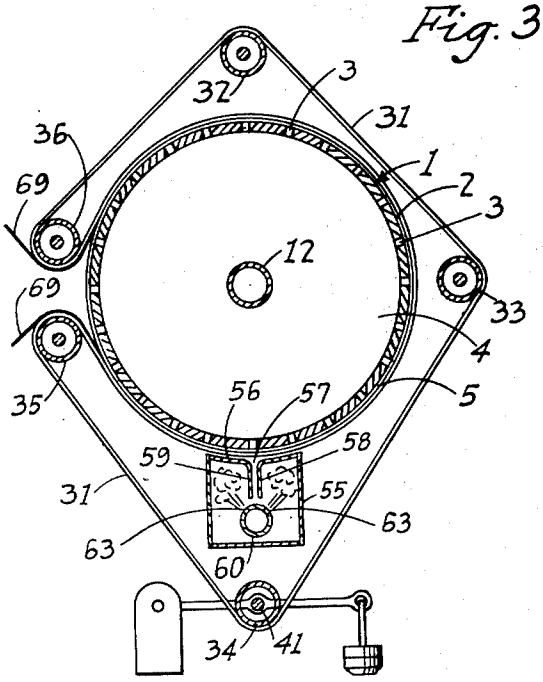


Fig. 4

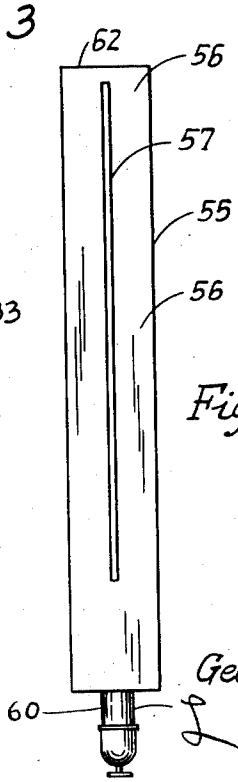


Fig. 5

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UNITED STATES PATENT OFFICE

2,494,807

DECATING MACHINE

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Application January 15, 1946, Serial No. 641,392

7 Claims. (Cl. 68—5)

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This invention is a new and useful improvement in decating machines and will be fully understood from the following description read in conjunction with the drawings in which:

Fig. 1 is a side view of one embodiment of my invention.

Fig. 2 is a view of the reverse side of the construction shown in Fig. 1.

Fig. 3 is a front view of part of the construction shown in Figs. 1 and 2.

Fig. 4 is a section through the construction shown in Fig. 3 on the plane indicated by 3—3, and

Fig. 5 is a top view of one element of the construction shown in the preceding figures.

Decating machines are used in the textile industry to improve the appearance and finish of textile fabrics. In operation, the piece or bolt of textile fabric to be treated together with a suitable blanket which is somewhat wider than the goods is wound snugly upon a hollow perforated cylinder. When this operation has been finished, steam is forced into the cylinder and out through the perforations until it has completely permeated the blanket and the textile fabric to be treated. After the steaming has been completed vacuum is applied to the interior of the cylinder which draws air in through the perforations and through the blanket and textile fabric thereby stripping the steam out of the blanket and fabric. This is necessarily a batch operation. Time is required to fully permeate the blanket and fabric with steam and thereafter to completely strip the steam from the blanket and fabric. There may also be some difference in the time and degree of treatment which the inner and outer layers of the fabric have received. Decating machines have been proposed in which the fabric moves continuously through the machine and the operation is therefore continuous. Such machines as heretofore proposed, however, are incapable of yielding a product comparable in appearance and finish with that heretofore obtained from the batch decating machines now in commercial use. My invention comprehends an improvement upon such continuous machines whereby a product may be obtained that is fully comparable with that now obtainable from the batch machines in commercial operation with the additional advantages of continuous operation and a greater uniformity of treatment.

The apparatus (Fig. 1) includes cylinder 1, the internal construction of which is shown in the sectional view appearing in Fig. 4. The tubular wall 2 of the cylinder is of metal and is provided

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with a multiplicity of perforations 3 which are shown diagramatically in Fig. 4. In practice, these perforations may, for example, be approximately $\frac{3}{16}$ inch in diameter and spaced approximately one inch apart. These perforations communicate with the interior 4 of the cylinder which is hollow. The jacket 5 surrounds the perforated tubular portion of the cylinder and overlays the perforations. Jacket 5 may be composed of a closely woven or felted material. Its function is to cushion and uniformly support the textile fabric to be treated and, in addition, to establish uniformly permeable communication between the textile fabric and the perforations 3. Another function of the jacket is to prevent the textile fabric from undergoing shrinkage in the width while being processed.

The end 6 of the cylinder shown in Fig. 1 is a closed flange which carries axially the shaft 7. Shaft 7 is in turn splined to driving means 8. This driving means in the particular embodiment shown is a pulley adapted for V-belt drive although, of course, any alternative driving means such as a flat pulley or sprocket wheel may alternatively be employed. The shaft 7 is provided with a journal or bearing surface 9 (Fig. 3) which is rotatably supported in a suitable bearing (not shown).

The opposite end 11 of the cylinder (Fig. 2) carries axially the shaft or spindle 12 (Fig. 3). This shaft or spindle is provided with a journal or bearing surface 13 rotatably mounted in a suitable bearing (not shown). The shaft or spindle 12 is hollow (Fig. 4) and therefore communicates freely with the interior 4 of cylinder 1. The outer end of the shaft or spindle 12 passes through stuffing box 14 into the hollow fitting 15 which is in turn connected to pipe 16 (Fig. 3). Pipe 16 is in turn connected (Fig. 2) to the intake 17 of a suitable suction pump 18 which in the specific embodiment shown is of the centrifugal type discharging through outlet 19. The pump 18 (Fig. 1) is driven through pulley 21 and belt 22 by the drive pulley 23 carried by electric motor 24.

The pulley 8 (Fig. 1) and of course the cylinder 1 which is connected thereto is driven through V-belt 25 by the reduction gear 26 which is in turn driven by the electric motor 27.

The device is also provided (Fig. 4) with the endless blanket 31 carried on the rollers 32, 33, 34, 35 and 36. Each of these rollers is provided with a shaft or axle mounted in suitable bearings (not shown) to permit the roller to rotate freely. The blanket 31 fits snugly against jacket 5 sur-

rounding cylinder 1 and is driven or carried by engagement with jacket 5 or with the fabric to be treated when the machine is in operation and such fabric is resting on jacket 5 as will be hereinafter explained.

Suitable means is provided to insure uniform tension on the endless blanket 31. In the embodiment shown the roller 34 is carried by axle 41, one end of which is rotatably mounted (Fig. 2) in the bearing 42 formed in the lever 43. This lever is pivotally mounted on the shaft 44 carried by the block 45 while the other end 46 of the lever 43 is provided with adjustable weights 47. The other end (Fig. 1) of the axle 41 is rotatably mounted in bearing 48 formed in lever 49. Lever 49 is pivotally carried by shaft 51 supported by block 52. The other end 53 of the lever 49 is similarly provided with adjustable weights 54.

Immediately beneath the cylinder 1, I provide the steam duct 55 extending longitudinally of cylinder 1. The upper surface 56 of the duct 55 is of arcuate form concentric with cylinder 1 thereby forming a face plate which conforms substantially to the tubular surface of the endless blanket 31 and is located close to the blanket but is preferably spaced a short distance from the blanket so that the blanket is not in rubbing contact with the same. A clearance of $\frac{1}{16}$ inch has been found satisfactory. Means for discharging steam at high velocity is also provided within upper surface 53 and extending longitudinally thereof. It is preferably located substantially in the longitudinal center of the surface 56. This means may comprise a number of small holes oriented preferably along the longitudinal center of the surface 56 but is preferably in the form of a long narrow slot 57 (Figs. 4 and 5) similarly oriented. In actual practice, the slot 57 is preferably about $\frac{1}{32}$ inch in width and extends to within two inches of the outer edge of the endless blanket 31. It is entirely surrounded by the surface 56 which, as shown in Fig. 5, extends longitudinally beyond the slot 57 to at least the outer edges of the endless blanket 31. In any case, I provide some means within the duct 55 adapted to conduct steam to the said "means for discharging." In the preferred construction where the means for discharging is a slot such as 57 this means consists of plates 58 and 59 (Fig. 4) preferably oriented in parallel planes and extending from the slot downwardly into the duct 55 to form a passageway which conducts steam telescopically from the interior of duct 55 to the discharge slot 57. In operation, steam must of course be carried into the duct 55 and for this purpose I provide (Fig. 3) the steam inlet pipe 60 controlled by valve 61. This pipe may simply communicate with the interior of the duct 55 but in practice I find it preferable to extend it longitudinally within the duct 55 for substantially the entire length of the duct closing the end of the pipe 60 which is adjacent the end 62 of the duct 55. The pipe 60 is then provided with a multiplicity of perforations 63 (Fig. 4) by which steam may be uniformly discharged along the interior length of the duct 55. I find it of advantage, as illustrated in Fig. 4, to form these perforations 63 so that they are directed diagonally upward and away from the space between the plates 58 and 59. By this arrangement any entrained drops of water are projected forcibly against the interior surface of the duct 55 and thereby eliminated from the steam which issues from slot 57. This arrangement moreover facilitates the transfer of

heat into the plates 58 and 59. As the steam moves from the interior of duct 55 through the space between these plates it undergoes some expansion with a consequent cooling effect which is to a large extent overcome by the temperature differential between the issuing steam and the plates 58 and 59 so that the steam issues from the slot 57 at a relatively high temperature and with some superheat. I find it preferable to maintain a steam pressure within the duct 55 of between two and ten pounds gauge. Any condensate separating in the duct 55 is withdrawn through the bleeder 64 (Fig. 3) controlled by valve 65.

In operation, the cylinder 1 is rotated by motor 27 and reduction gear 26. In actual practice with a cylinder 22 inches in diameter I have found that speeds of from 10 to 20 R. P. M. will give entirely satisfactorily results but I do not wish to be understood as restricting the successful operation of the device to these speeds.

The suction pump 18 driven by motor 24 is then started. In actual operation, I have found that a pump capacity necessary to create a vacuum of two inches in the interior of cylinder 1 will give entirely satisfactory results but I do not wish to be understood as limiting the successful operation of the device to this particular range of vacuum.

The valve 61 is then opened to admit steam to the duct 55 with the result that a steam pressure of from two to ten pounds is developed in the duct 55 and steam is discharged at high velocity from the slot 57. This steam spreads out over the face of face plate 56 and over this general area is forced upwardly through the endless blanket 31 at a high velocity and at an elevated temperature. Over the entire remainder of the surface of cylinder 1 air is simultaneously drawn in through perforations 3 to comingle with the steam in the interior of cylinder 1 from which the mixture of air and steam is discharged through the outlet 19.

When operating conditions have been established the band of textile material 69 is fed into the machine. This band 69 of textile material is engaged in the bite 70 between the jacket 5 and the endless blanket 31 and is carried thereby on cylinder 1 between the jacket and the blanket in the direction indicated by arrow 71. Any suitable tensioning device may be used to insure that the band of textile material as it enters the machine is fully expanded and extended and is free from pleats and wrinkles. The band 69 of textile material emerges from the machine at the point 72 and may then be folded or may alternatively if desired be carried forward continuously to any succeeding stage of the process.

The brief interval in which the textile fabric 69 is passing over the face plate 56 and during which steam is being forced through the material is sufficient to impart to the fabric the desired improvement in handle and appearance. During the remainder of its travel over the cylinder 1 between jacket 5 and blanket 31 the air which is drawn through the fabric removes the steam and sets or fixes in the fabric the qualities desired.

The foregoing description is by way of illustration and not of limitation and I am not to be limited to any details but only by the appended claims.

I claim:

1. In a decating machine which includes an externally perforate hollow cylinder and means

for rotating said cylinder and means for applying suction to the interior of said cylinder and a blanket running against a part of the periphery of said cylinder adapted to hold a band of textile material in engagement with the periphery of said cylinder; means for discharging steam adjacent a part of the periphery of said cylinder including nozzle orifice means extending longitudinally of said cylinder adjacent the exterior of said blanket and an arcuate face plate concentric with said cylinder surrounding said orifice means.

2. In a decating machine which includes an externally perforate hollow cylinder and means for rotating said cylinder and means for applying suction to the interior of said cylinder and a blanket running against a part of the periphery of said cylinder adapted to hold a band of textile material in engagement with the periphery of said cylinder; means for discharging steam adjacent a part of the periphery of said cylinder including a duct extending longitudinally of said cylinder, an arcuate face plate concentric with said cylinder carried by said duct and a nozzle orifice in said face plate extending longitudinally of said cylinder adjacent the exterior of said blanket.

3. In a decating machine which includes an externally perforate hollow cylinder and means for rotating said cylinder and means for applying suction to the interior of said cylinder and a blanket running against a part of the periphery of said cylinder adapted to hold a band of textile material in engagement with the periphery of said cylinder; means for discharging steam adjacent a part of the periphery of said cylinder, including a duct extending longitudinally of said cylinder, an arcuate face plate concentric with said cylinder carried by said duct, an orifice in said face plate communicating with said duct and means within said duct connected to said orifice adapted to conduct steam to said orifice.

4. In a decating machine which includes an externally perforate hollow cylinder and means for rotating said cylinder and means for applying suction to the interior of said cylinder and a blanket running against a part of the periphery of said cylinder adapted to hold a band of textile material in engagement with the periphery of said cylinder; means for discharging steam adjacent a part of the periphery of said cylinder, including a duct extending longitudinally of said cylinder, an arcuate face plate concentric with said cylinder carried by said duct, orifice means in the form of a slot in said face plate extending longitudinally of said cylinder adjacent the exterior of said blanket and a plate adjacent either side of said slot form orifice means extending therefrom into said duct adapted to conduct steam to said orifice.

5. In a decating machine according to claim 4 in which the said plates are in parallel planes and positioned and shaped to conduct a substantially non-turbulent flow of steam to said orifice.

6. In a decating machine which includes an externally perforate hollow cylinder and means for rotating said cylinder and means for applying suction to the interior of said cylinder and a blanket running against a part of the periphery of said cylinder adapted to hold a band of textile material in engagement with the periphery of said cylinder; means for discharging steam adjacent a part of the periphery of said cylinder, including a duct extending longitudinally of said cylinder, an arcuate face plate concentric with said cylinder carried by said duct, orifice means in said face plate extending longitudinally of said cylinder adjacent the exterior of said blanket, means in said duct adapted to conduct steam to said orifice means, a perforate pipe extending longitudinally within said duct adapted to carry steam into said duct and steam jets in said pipe directed diagonally upward and away from said means for conducting steam to said orifice means.

7. In a decating machine which includes an externally perforate hollow cylinder and means for rotating said cylinder and means for applying suction to the interior of said cylinder and a blanket running against a part of the periphery of said cylinder adapted to hold a band of textile material in engagement with the periphery of said cylinder; means for discharging steam adjacent a part of the periphery of said cylinder, including a duct extending longitudinally of said cylinder, an arcuate face plate concentric with said cylinder carried by said duct, an orifice in the form of a slot in said face plate extending longitudinally of said cylinder adjacent the exterior of said blanket, plates within said duct one adjacent each side of said orifice adapted to conduct steam to said orifice, a perforated pipe extending longitudinally within said duct and steam jets in said pipe directed diagonally upward and away from said plates.

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